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The Weather Whisper

A Peek Behind the Curtain—NWS Observation Program

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Considering it is in our name, it probably doesn't surprise anyone that one of our main jobs is to provide weather forecasts and watch and warning products, right? But did you know that we, and this goes for every National Weather Service Forecast Office, also maintain various types of equipment within our forecast area? Often this equipment is in conjunction with other state and federal agencies and includes automated weather observing stations at airports, river height gauges, weather radio transmitters, a mixture of other manual and automated temperature and precipitation equipment, and of course our biggest piece of equipment, our weather radar. All of the equipment helps us produce forecasts and warning products so our partners and customers (you!) can make informed decisions. Just like any equipment such as your car, furnace, air conditioner, and so on, regular maintenance is a must. Let's take a quick glimpse at what fall maintenance entails within our Cooperative Observer Network.

The Cooperative Observer Network, Coop Network for short, is made up of a mixture of civic minded citizens and institutions that record and relay temperature and/or precipitation observations to us on a daily or monthly basis. The majority of the equipment within the Coop Network requires little intervention on our part once it is properly sited and installed, including manual rain gauges, snowboards, and temperature sensors. Many observers have what we call a standard rain gauge, which is either 4 or 8 inches in diameter and includes a funnel top and an inner tube (*Image 1*). As we transition into winter each year, we remind observers to remove the funnel top and inner tube as they can be damaged when water freezes within. This also allows snow to more easily collect within the rain gauge, which can then be melted and measured to get the liquid equivalent for that snowfall.

Fun fact, since the inner tube is a smaller diameter than the funnel top (*Image 2*), you cannot use a regular ruler to measure how much precipitation fell. We provide observers with a specialized ruler that allows them to accurately measure precipitation that takes into account the difference in diameter of the funnel top and the inner tube. In cases of snowfall, once the snow in the rain gauge is melted down, the observer can pour it into the inner tube they removed for the winter and use the specialized ruler to get the liquid equivalent.

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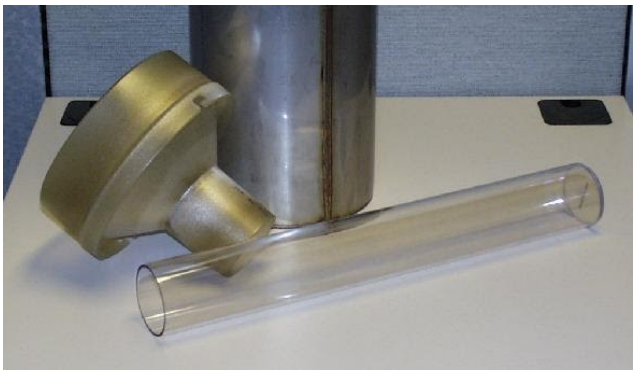


Image 2: Funnel top and inner tube of an NWS standard 8 inch diameter rain gauge.

Sunset from the office on the first day of Meteorological Winter—December 1, 2021

Special points of interest

- A look at the NWS observation network
- Holiday Climatology

Image 1: NWS standard 8 inch diameter rain gauge

Observation Program—cont'd

Image 3: A Fischer-Porter Automated Precipitation Gauge

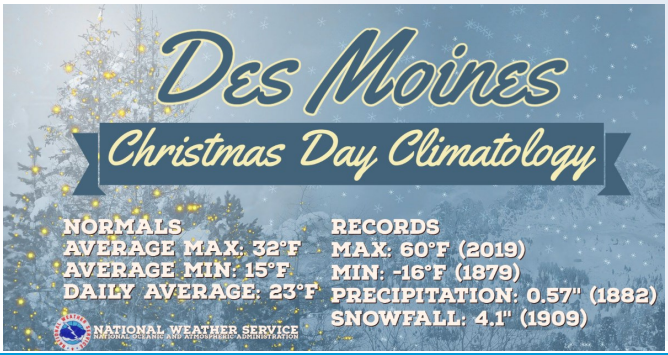
Image 4: A dirty (oil mixture) and partially frozen Fischer-Porter Collection Bucket thawing during a fall routine and preventative maintenance visit .

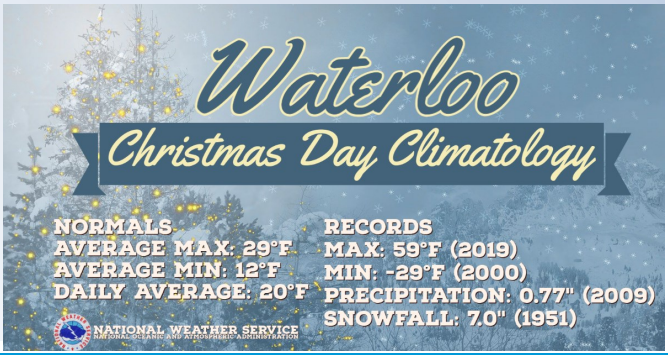
In addition to removing the funnel and inner tube of the rain gauge, we ask observers to set out their snowboard for the season. The snowboard is a white board where falling snow can collect and be easily measured during or after each snowfall event. It is white to prevent excessive absorption of sunlight, which would increase the board's temperature and can often cause snow to melt even if the air temperature is below freezing.

All of that is done by the observer, which is good considering our office oversees more than 100 Coop Network sites across central Iowa! However, there is also a network of automated rain gauges that does require us to visit twice a year for routine and preventative maintenance. Those gauges are called Fischer-Porter Precipitation Gauges (*Image 3*) and use a sensor and other electronic equipment to weigh the precipitation in the bucket and convert it to a precipitation amount. These gauges catch falling precipitation and can detect down to one hundredth of an inch, whether it be rain or snow since it is measuring weight.

In the spring and fall, we visit each Fischer-Porter gauge (currently 29) to clean them and prepare them for the upcoming season. At both visits, a type of oil is added to the collection bucket to prevent evaporation since the oil will float on top. In the winter, propylene glycol is also added. As the propylene glycol mixes with precipitation in the bucket, it lowers the freezing point of the mixture (propylene glycol itself freezes at about -74°F) to prevent ice from forming, which could damage the bucket and harm the gauge's inner electronics if the bucket cracks and leaks(*Image 4*). In both seasons, the oil and propylene glycol mixtures are collected and disposed of back at the office to prevent any damage to surrounding vegetation and waterways.

There you have it, a quick glimpse into some of the seasonal maintenance activities we perform as part of our Cooperative Observer Network!





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